

Book Review: Simon Schwartzman, *A Space for Science The Development of the Scientific Community in Brazil*. University Park: Pennsylvania State University Press, 1991, 286 pages.

By Aaron Segal, University of Texas at El Paso. *Interciencia*, Mar-Apr 1994, vol. 19, n. 2., p. 100-101.

Brazil has the largest and most diverse scientific community in Latin America and the largest absolute expenditures on applied and basic research. It leads Latin America in the number of annual science citations, ranking around 25th in the world. In spite of these and other achievements this definitive history of science in Brazil by Simon Schwartzman finds that "successes have been few and ephemeral but persistence and enthusiasm have always been present."

This landmark study was first published in 1979 in Portuguese as *Formação da comunidade científica no Brasil*. Now it is available in English in a revised, updated and slightly extended version. Based initially on a generously funded 1970's research project including interviews with 70 Brazilian scientists this was the first in-depth history of any Latin American scientific community. Although it has been followed by informative national histories of science in Argentina, Chile, Cuba, Mexico and Venezuela and by many biographies and a few reviews of individual disciplines, this pioneer effort in its revised version remains an essential reference and research tool.

The revised version in English has been pruned to cutback details primarily of interest to Brazilian readers. A brief introduction has been added to help general readers interested in the history and evolution of science and an epilogue to cover Brazil during the 1980's. These revisions are not entirely satisfactory. The attempt to relate Brazil to 16th-18th century European science does not explain how and why major ideas did or did not reach the giant colony.

The epilogue concludes that "it is clear that a space for science in terms of socially defined, accepted and institutionalized scientific role is barely there." While there is a cogent analysis of the Brazilian emphasis on a handful of well-funded research universities in a vast sea of mediocre higher education, there is little on the Ministry of Science and Technology, the role of

the Brazilian Society for the Progress of Science, or the evolution of research and development budgets. Massive investments in technology projects in nuclear energy, space, aviation and other areas are criticized for being cost-ineffective without building significant indigenous capabilities. Even more distressing is the observation that "it is now clear that the political enlightenment inherent in an open political regime does not necessarily imply an equally progressive approach to matters of science, technology and education." Unfortunately there is no explanation of why the scientific community which has actively participated in elected, civilian regimes has seen its reform projects largely stymied. There are only hints about "a pervasive uncertainty about the future" and the continued research dominance by 5 universities: São Paulo, Rio de Janeiro, Campinas, Júlio de Mesquita (São Paulo), and the Escola Paulista de Medicina.

The conclusion is a plea for Brazilian science for the sake of science. "To find its space, scientific research must assert its own worthiness, independent of its broader implications and consequences for Brazil's educational, technological and economic institutions." Admirable as this objective may be its realization is another matter.

The strength of this volume, as its 1979 predecessor in Portuguese, is the panoramic history of Brazilian science from its colonial and Imperial inceptions to its 20th century evolutions. The emphasis is on higher education, the founding of the University of São Paulo in 1934, the recruitment of European faculty, the technological "Great Leap Forward" of the 1970's and other factors and events. The treatment is balanced, enhanced by use of interviews, informed and probing. The myth that Brazil was "a rural, traditional, and deeply Catholic society which then evolved gradually into modernity" is firmly dispelled. Brazil may not yet have a firm space for science but it has made space for a definitive history of its science.

Luso-Brazilian Review, vol. 31, n.1, Summer of 1994, p. 120-121. By Donald B. Cooper, The Ohio State University

The basic purpose of this fine volume is to "draw a broad picture of the arrival and growth of empirical science in Brazil" (vii). Emphasis is placed on the biological and hard science - physics, chemistry, biology, the earth sciences - with some attention paid to technology, medicine, engineering, agriculture, and mathematics, and virtually none to the social sciences and the humanities. Printed sources, many of them little known, have been exhaustively consulted, but the core of the research is lengthy, open-ended interviews conducted in 1977 with some 70 Brazilian scientists.

Many readers will be familiar with the earlier Portuguese version of this book published in 1979. The present English edition has been revised, corrected, and updated, and is substantially a new volume. It offers an explicit interpretive framework, and a broad historical context, for readers who are not specialists in Brazilian studies. The book is therefore a reliable and instructive source for understanding the growth of Brazilian science, including both institutions of research and higher education. It also provides basic biographical and professional data on dozens of scientists, not only Brazilians but also foreigners who lived and worked in Brazil.

Schwartzman has written an honest, revealing, and pessimistic book. He uses the tale of Sisyphus as a metaphor for Brazilian science. "Cursed by the gods, Sisyphus was condemned to carry a large stone uphill, only to watch it roll back down, and start all over again" (1). Creating a "space for science" has been a difficult and uphill struggle in Brazil. A modest beginning 'was made in the long imperial period (1822-1889), but the few scientific institutions of the 19th century, such as the Botanical Garden and the Royal Museum, produced few lasting results.

In the early 20th century, however, against all odds, the Manguinhos Institute of Rio de Janeiro (later Oswaldo Cruz Institute) emerged as a significant center for both applied science and new research. Oswaldo Cruz and Carlos Chagas earned well deserved world wide reputations. It was the sole scientific center of distinction in that era. Conversely, the School of Medicine of Rio de Janeiro in the 1920s had "no practical courses, no seminars, no contacts between professors and students; only professional lectures..." (174).

In the 1930s, however, the "establishment of the Universidade de São Paulo in 1934 [became] the most important event in Brazil's scientific and educational history" (127). The School of Medicine in São Paulo became the best of its kind in Brazil. It was a scientific reminder of the preeminent, indeed dominant, role of the city and state of São Paulo in the Brazilian federation.

Schwartzman credits Europeans (including Germans, Italians, Belgians, Frenchmen and Englishmen) and Americans with a major role in training Brazilian teachers and researchers. The Rockefeller Foundation in particular lent valuable assistance in fighting yellow fever, and in the construction of new scientific laboratories. In time American models were adopted as the standard for most Brazilian scientific institutions.

There is no question that this is the outstanding history in English of the development of empirical science in Brazil. It should have wide appeal to all Brazilianists, and historians of science; it is also a case study of the difficulties of creating "a space for science" in a so-called

"Third World" nation. It is in many respects a cautionary tale, a story of inadequate resources, of false starts and blind alleys, of governmental meddling and professional bungling. Furthermore, despite some advances in recent years, such as the expansion of the number of federal universities, and also the continued dogged persistence of numerous talented scientists, Schwartzman warns of "the ghost of premature decay is very present in Brazilian society..." In scientific terms there is much more science and technology than twenty years ago, "but it is clear that a space for science, in terms of socially defined, accepted, and institutionalized scientific roles, is barely there" (238). Sisyphus may be about to see the stone of scientific progress roll down the hill once more, another victim of the debt crisis and political instability in Brazil.